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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/996,143	11/28/2001	Roger L. Frick	30203/37899/US	3060

4743 7590 02/25/2004

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EXAMINER

AL NAZER, LEITH A

ART UNIT	PAPER NUMBER
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2828

DATE MAILED: 02/25/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/996,143

Applicant(s)

FRICK, ROGER L.

Examiner

Leith A Al-Nazer

Art Unit

2828

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 November 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-61 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-61 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Paul IP

PAUL IP
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 November 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 4,6,8.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "514" has been used to designate both a top surface in figure 14 and a side surface (?) in figures 15 and 16. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

2. The disclosure is objected to because of the following informalities: Reference number 509 (shown in figure 14) is not addressed in the specification.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-44 and 57-61 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Independent claims 1, 20, 35, 40, and 57 recite a variable gap that varies in response to a sensing surface. However, the claims fail to provide the necessary structure and structural

Art Unit: 2828

connections to properly conform the invention. For example, no structure is provided that is capable of varying the gap in the resonator; therefore, how is the gap distance varied? And how is the sensing surface connected to the variable gap?

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1, 7, 11, 12, 15-22, 26, 27, 29-34, 40, 43, and 45-61, are rejected under 35 U.S.C. 102(b) as being anticipated by Killpatrick et al '792.

With respect to claims 1, 11, 12, 15-19, and 45-56, Killpatrick teaches an optical resonator (10) disposed to receive at least a portion of a pulsed laser energy, the optical resonator having a sensing surface (24 and 26) responsive to changes in the measurable parameter at the sensing surface and the optical resonator defining a cavity forming a variable gap (column 4, lines 30-40) that varies in response to the sensing surface and that is positioned such that the repetition rate of the pulsed laser energy changes in response to changes in the measurable parameter.

With respect to claims 7, 26, and 43, Killpatrick teaches a ring resonator (figure 6).

With respect to claims 20-22, 27, 29, 30, and 32-34, Killpatrick teaches an optical resonator (10) having a sensing surface (24 and 26) responsive to changes in the measurable parameter at the sensing surface, the optical resonator defining a resonant frequency (figure 6)

Art Unit: 2828

that is dependent upon the measurable parameter at the sensing surface, the optical resonator being disposed such that a laser signal from the optical sensor apparatus has a frequency at the resonant frequency, the optical resonator further defining a cavity forming a variable gap (column 4, lines 30-40) that varies in response to the sensing surface.

With respect to claim 31, Killpatrick teaches a measuring apparatus (24, 26, 27) for measuring the frequency of the laser signal.

With respect to claim 40, Killpatrick teaches a variable frequency resonator (figure 6) comprising an optical resonator having a sensing surface (24 and 26) and having a waveguide having a cavity defining a variable gap (column 4, lines 30-40), the optical resonator characterized by a resonant frequency that is dependent upon the variable gap which is disposed to alter the resonant frequency of the optical resonator in response to changes in the measurable parameter at the sensing surface.

With respect to claims 57-61, Killpatrick teaches an optical resonator (10) having a variable gap (column 4, lines 30-40) that varies in response to changes in a measurable parameter, the optical resonator receiving light energy from the light source to alter a characteristic of the light energy in response to variations in the variable gap.

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Art Unit: 2828

8. Claims 35-39 and 41 are rejected under 35 U.S.C. 102(e) as being anticipated by Maleki et al '218.

With respect to claims 35-39 and 41, Maleki teaches an apparatus comprising a coupler (121) coupled to receive laser energy; and an external high Q resonator (110; column 3, lines 15-60) characterized by a resonant frequency that varies in response to changes in the measurable parameter.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. Claims 2-6, 8, 23-25, and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Killpatrick et al '792 in view of Ball et al '913 or Hicks '087.

Art Unit: 2828

Claims 2 and 23 require a waveguide for propagating the at least a portion of the laser energy. Ball (figure 1) and Hicks (figure 1) both teach such a waveguide. At the time of the invention, it would have been obvious to one having ordinary skill in the art to combine the waveguide of Ball or Hicks with the system of Killpatrick. The motivation for doing so would have been to provide means for guiding the laser light to a desired location.

With respect to claims 3-5, 24, and 42, Ball (column 11, lines 57-60) and Hicks (column 7, lines 14-20) both teach the waveguide further comprising a core and a cladding surrounding the core.

With respect to claims 6 and 25, Hicks teaches the optical resonator further comprising a first reflector (12) at an entrance end of the optical resonator and a second reflector (12') at an exit end of the optical resonator.

With respect to claim 8, Hicks teaches the ring resonator being formed of an optical fiber (figure 13).

12. Claims 9, 13, 14, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Killpatrick et al '792 in view of Ho et al '799.

Claim 9 requires the ring resonator be formed in an optical substrate. Ho teaches such a setup (figures 8 and 9). At the time of the invention, it would have been obvious to one having ordinary skill in the art to combine the ring resonator of Ho with the system as taught or suggested by Killpatrick. The motivation for doing so would have been to provide a suitable waveguide medium with desired properties.

Claims 13, 14, and 28 require the optical resonator be comprised of a microdisc.

Art Unit: 2828

13. Claims 10 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Killpatrick et al '792 in view of Weisbuch et al.

Claims 10 and 44 require the ring resonator be formed of a photonic crystal structure. Photonic crystal structures are well known in the art, as is evidenced by Weisbuch. Therefore, at the time of the invention, it would have been obvious to one having ordinary skill in the art to combine the photonic crystal structure of Weisbuch with the system as taught or suggested by Killpatrick. The motivation for doing so would have been to provide a suitable waveguide medium with desired properties.

Communication Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leith A Al-Nazer whose telephone number is 571-272-1938.

The examiner can normally be reached on Monday-Friday 7:30am-4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Ip can be reached on 571-272-1941. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2828

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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